



Certified Coatings Inspector Theory Exam

Exam Preparation Guide

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Introduction

The AMPP Certified Coating Inspector (Level 2) Exam is designed to assess whether a candidate has the requisite knowledge and skills that a minimally qualified Certified Coating Inspector must possess. The 100 questions (multiple-choice and fill in the blank) are based on the Certified Coating Inspector body of knowledge. A candidate should have working knowledge of all corrosion, surface preparation, cleanliness, environmental conditions, test instruments, coating mixtures, and safety. A candidate should also be able to perform unsupervised non-destructive inspections of liquid and non-liquid coatings to any substrate in a shop setting (e.g., workshop, factory, or plant) or under the supervision of a level 3 inspector when working in a field setting (e.g., production facilities, plants, or oil fields).

Test Name	AMPP- Certified Coating Inspector (Level 2) Exam
Test Code	NACE-CIP2-001
Time	2 ½ hours
Number of Questions	100
Format	Computer Based Testing (CBT)

NOTE: A pass/fail grade is provided at the end of the exam.

Target Audience

A Certified Coating Inspector is responsible for performing and documenting non-destructive inspections of liquid and non-liquid coatings to any substrate in a shop setting (e.g., workshop, factory, or plant) or under the supervision of a Senior (Level 3) inspector when working in a field setting (e.g., production facilities, plants, or oil fields).

Requirements

Requirements for Coating Inspection Program Level 2- Certified

■ Work Experience and Education Prerequisite ■ Course ■ 2 Core Exams ■ Application

Prerequisites
Certification - CIP level 1 Work experience- 2 years of coating related work experience
Course Requirements
Successfully complete the following course: +Course - Certified Coating Level 2
Core Exam Requirements
Exam - Certified Coating Inspector Written Exam – (Level 2) Exam - Certified Coating Inspector Practical Exam – (Level 2)
Application required

Certification renewal requirements–

- Recertification application* required every 3 years
- 1.5 years of corrosion work experience in coating Inspection
- 8 hours per year of ongoing Professional Development Activity (24 hours total for the 3-year cycle)

Upon successful completion of requirements, the candidate will be awarded a **Certified Coating Inspector certification**

**Approval required*

Exam Blue Print

NOTE: At the end of the CBT exam the candidate will receive a bar chart of strengths and weaknesses that correspond to these Domains. The bar chart can be accessed by logging into your profile.

Domain 1- Safety - 2.5%

- Review of AMPP general safety statement for CIP Inspectors
- Review of sample SDS
- How to report safety violations
- Review and expanded explanation of job-specific safety concerns as they relate to specialty areas (i.e., waterjetting, water blasting, and non-liquid coating systems)

Domain 2- Inspection Process - 15%

- Review AMPP view of role of CIP Inspector - including restrictions @ each level
- Review Purpose of Inspection – expanded explanation of cost justification
- Review Specification – expanded explanation of role in the inspection process
- Review Product Data Sheets – expanded explanation of the role in the inspection process
- Review Standards – expanded explanation of the role in the inspection process
- Review Codes – expanded explanation of role in the inspection process
- Review Inspection and Test Plans – expanded explanation of their role in the inspection process
- Review Pre-Job Conference – expanded explanation of role in the inspection process
- Review Visual Inspection - class exercises to test inspector's ability to perform visual inspection
- Review Verification vs. Hold Point Inspections
- Review Non-Destructive Instrumentation Inspection--expanded explanation of role in the inspection process
- Destructive Instrumentation Inspection – hands-on use of instruments and the role in the inspection process
- Review of Documentation – expanded explanation of role in the inspection process
- Introduction to coating survey

Domain 3- Corrosion - 5%

- Review of corrosion cell c/w anode/cathode relationships
- Review of Galvanic Corrosion
- Discussion of Factors Influencing Corrosion Rates
- Discussion of Types of Corrosion - General, Localized, Crevice, Flow-assisted Corrosion
- Discussion of corrosion control types
- Discussion of Basic Principles of Cathodic Protection –systems, c/w Cathodic Disbondment Testing

Domain 4- Environmental Controls and Inspection - 5%

- Review effect of air, surface, dew point temperature and relative humidity on coating operations
- Explanation of both Regenerative Desiccant and Refrigeration Dehumidification – equipment types, benefits, and consequences of interruption
- Discussion of enclosures including lighting, ventilation, air movement (changes)
- Introduction to advanced environmental testing equipment and data loggers

Domain 5- Surface Preparation and Inspection - 20%

- Review of design and fabrication defects
- Review of solvent/hand/power tool cleaning and abrasive blasting of steel surfaces
- Review and expanded explanation of waterjet cleaning and centrifugal blast cleaning.
- Review and expanded explanation of residual soluble salts removal and demonstration of two additional test methods
- Review of all relevant NACE, SSPC, ASTM and ISO standards for solvent/hand/power tool cleaning, abrasive blasting, water blasting, waterjetting cleaning of steel and tests for residual soluble salts
- General explanation of surface preparation methods used on ferrous, non-ferrous and cementitious substrates
- Review the use of replica tape, digital surface

profile gage, ISO comparators

- Explanation and demonstration of the CRI

Domain 6- Coatings and Inspection - 20%

- Review of Coating Fundamentals including basic constituents and modes of protection
- Review and expanded explanation of classifications including generic types
- Review and expanded explanation polymerization, curing mechanisms and potential defects with each mechanism
- Explanation of Linings and special coatings, including anti-fouling, fireproof and flow coatings.
- Explanation of thick barrier linings (rubber and sheet membranes)
- Review of coating specifications
- Explanation of non-liquid coatings & galvanizing

Domain 7- Coating Application - 7.5%

- Review of brush, mitt, roller, conventional air spray, airless and air assisted application methods including basic troubleshooting
- Review of stripe coating
- Review importance of surface preparation and mixing on coating quality.
- Basic explanation of electrostatic spray, flow and flood coating, fluidized bed coating, centrifugal spray, flame spray and Rotolining application methods

Domain 8 - Documentation - 10%

- Review of importance of documentation and reporting to the inspection process
- Review coating specifications, inspection reports, and product and safety data sheets

Domain 9 - Standards - 10%

- Review of Level 1 Reference Standards

Domain 10 - Team Work - 2.5%

- Intermediate understanding of team work (DISC)

Domain 11- Ethics - 2.5%

- Intermediate understanding of ethics required of an AMPP Certified Inspector (as per attestation)

comparators for surface profile on concrete associated with ASTM D 7682, spray metallizing, pipeline and field joint coatings, and powder coatings. Review of magnetic DFT gages

- Review of holiday detection instruments
- Explanation, demonstration and use of Eddy current and ultrasonic gages.
- Explanation and demonstration of destructive tests and instruments, i.e. Hardness testers, Adhesion testers and tests for cure.
- Explanation of specialized tests and test equipment (e.g., cathodic disbondment tests, laboratory analysis)
- Review and expanded explanation of coating failure modes and relevant inspection criteria
- Explanation of coatings surveys
- Basic explanation of the application and inspection of linings and special coatings
- Detailed explanation of plural component spray c/w basic troubleshooting
- Explanation of coating and lining of concrete
- Explanation of maintenance coating operations.
- Explanation of rubber and thermoplastic sheet linings
- Explanation of reinforced coatings and linings

- Explanation of pipeline and field joint coatings
- Explanation, demonstration use and development of an Inspection and Test Plan and a Final Report

- Review, interpretation and use of all relevant standards referenced in Level 2

Types of Questions

Description of Questions

The questions on this exam are multiple-choice where there *may be more than* one correct answer. The questions are based on the knowledge and skills required in the coating inspector industry. While the training course is an excellent method of preparation it is not the only reference used in the development of the questions.

Sample Questions

The sample questions are included to illustrate the formats and types of questions that will be on the exam. Your performance on the sample questions should not be viewed as a predictor of your performance on the actual test.

1. Which test measures the force required to pull a specified test diameter of coating away from its substrate using hydraulic pressure?
 - A. Took Gage
 - B. Defelsko Positest AT
 - C. Pull off adhesion
 - D. Pneumatic Adhesion Tensile Testing Instrument (PATTI)

2. The paint inspection gauge (Tooke Gage) is used to measure
 - A. abrasion resistance.
 - B. Dry Film Thickness.
 - C. scratch resistance.
 - D. cure.

3. If silica gel becomes contaminated it will
 - A. hold more moisture.
 - B. lower the dew point.
 - C. no longer hold moisture.
 - D. raise the substrate temperature.

4. Which form of corrosion occurs at discrete sites on the metal surface?
 - A. General
 - B. Galvanic
 - C. Localized
 - D. Sacrificial

Answer Key

1. **b**

Reference: AMPP Certified Coating Inspector (Level 2) course materials. Chapter 12

2. **b**

Reference: AMPP Certified Coating Inspector (Level 2) course materials. Chapter 2

3. **c**

Reference: AMPP Certified Coating Inspector (Level 2) course materials. Chapter 13

4. **c**

Reference: AMPP Certified Coating Inspector (Level 2) course materials. Chapter 4

Preparation

Training

AMPP Certified Coating Inspector (Level 2)

Suggested Study Material

- AMPP Certified Coating Inspector (Level 2) course materials

Books

- Corrosion prevention by protective coatings by Charles Munger and revised by Lou Vincent et. al.
- Practical Math for the Protective Coatings Industry by Raymond Weaver
- Users Guide to Hot Dip Galvanizing by American Galvanizers Association
- SSPC Painting Manual Volume 1- Good Painting Practices
- SSPC Painting Manual Volume 2- Systems and Specifications

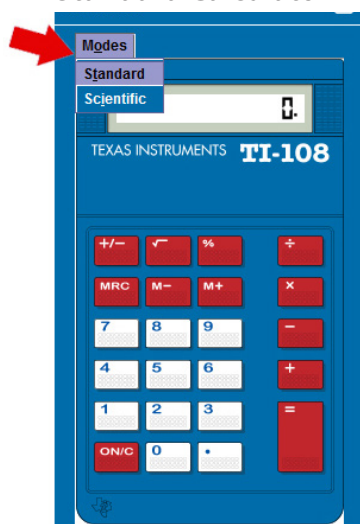
Standards

- ASTM Volume 06.01 Paint- Tests for Chemical, Physical, and Optical Properties; Appearance
- ASTM Volume 06.02 Paint- Products and Applications; Protective Coatings; Pipeline Coatings

Calculators

CBT exams contain a built-in calculator. Students will have access to either a TI Standard or TI Scientific calculator for use during the CBT Exam.

Standard Calculator



Standard Mode Functions

Add	$+$	
Subtract	$-$	
Multiply	\times	
Divide	\div	
Negative	$(-)$	
Percentage	$\%$	
Square Root	$\sqrt{}$	Example: $4\sqrt{}$
Reciprocal (Inverse)	x^{-1}	Example: $1\div 2=$
Store value to variable	$\text{M}+$	Example: $3\times 5=\text{M}+$
Access variable	MRC	Example: $7+\text{MRC}=\text{MRC}$
Clear variable	M- MRC	

Scientific Calculator



Scientific Mode Functions

Add	$+$	
Subtract	$-$	
Multiply	\times	
Divide	\div	
Negative	$(-)$	
Percentage	2^{nd} $\%$	
Square Root	$\sqrt{}$	Example: $2^{\text{nd}}\sqrt{}4\text{enter}$
Reciprocal (Inverse)	X^{-1}	Example: $2X^{-1}\text{enter}$
Store value to variable	$\text{sto}\blacktriangleright$ X^{yzt}	Example: $3\times 5\text{enter}\text{sto}\blacktriangleright X^{yzt}\text{enter}$
Access variable	X^{yzt} or $2^{\text{nd}}[\text{recall}]$	Example: $7+2^{\text{nd}}[\text{recall}]\text{enter}\text{enter}$

Numeric Notation

Standard (Floating Decimal)

Notation (digits to the left and right of decimal)

mode menu options

NORM SCI ENG e.g. 123456.78
 FLOAT 0 1 2 3 **4** 5 ... e.g. 123456.7800

Scientific Notation

(1 digit to the left of decimal and appropriate power of 10)

mode menu options

NORM **SCI** ENG e.g. 1.2345678×10^5

Engineering Notation

(number from 1 to 999 times 10 to an integer power that is a multiple of 3)

mode menu options

NORM **SCI** ENG e.g. 123.45678×10^3

Fractions

Simple fractions	$\boxed{\text{n/d}}$
Mixed numbers	$\boxed{2\text{nd}}$ $\boxed{[\text{Un/d}]}$
Conversion b/w simple fraction and mixed number	$\boxed{2\text{nd}}$ $\boxed{[\text{n/d} \blacktriangleleft \blacktriangleright \text{Un/d}]}$
Conversion b/w fraction and decimal	$\boxed{2\text{nd}}$ $\boxed{[\text{f} \blacktriangleleft \blacktriangleright \text{d}]}$

Powers, roots, and inverses

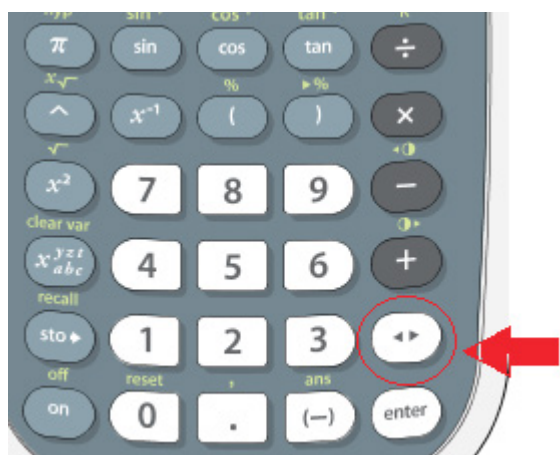
Square a value	$\boxed{x^2}$	
Cube a value	$\boxed{\wedge}$	
Raise value to specified power	$\boxed{\wedge}$	Example (2^4) $2 \boxed{\wedge} 4$
Square root	$\boxed{2\text{nd}}$ $\boxed{[\sqrt{\quad}]}$	Example ($\sqrt{16}$): $\boxed{2\text{nd}}$ $\boxed{[\sqrt{\quad}]}$ 16
Reciprocal	$\boxed{x^{-1}}$	Example (n^{th} root): 5 th root of 8: 5 $\boxed{2\text{nd}}$ $\boxed{[x^{\sqrt{\quad}}]}$ 8

Pi

PI (π)	$\boxed{\pi}$
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Toggle

The scientific calculator might show the results of certain calculations as a fraction - possibly involving pi or a square root. To convert this kind of result to a single number with a decimal point, you will need to use the "toggle answer" button circled in the picture below. Pressing this button will change the display from a fractional to a decimal format.



Answer Toggle



Press the  key to toggle the display result between fraction and decimal answers, exact square root and decimal, and exact pi and decimal.

Example

Answer toggle	$\boxed{2\text{nd}}$ $\boxed{[\sqrt{\quad}]}$ 8 $\boxed{\text{enter}}$	$\sqrt{8}$ $2\sqrt{2}$
	$\boxed{\text{toggle}}$	$\sqrt{8}$ $2\sqrt{2}$ 2.828427125

If you find this onscreen calculator difficult to use, raise your hand and ask the TA to provide you with a hand-held calculator. **If available**, you will be provided with a scientific or non-scientific calculator. Candidates are not permitted to bring their own calculator into the testing room.